PSYCHO-SOCIAL AND NUTRITIONAL CORRELATES OF ANEMIA IN PREGNANT WOMEN AND ITS EFFECT ON THE NEONATES: A COMPARITIVE STUDY OF RICH AND POOR URBAN POPULATION IN THE CITY OF AJMER

गर्भवती महिलाओं में रक्ताल्पता का मनोसामाजिक एवं पोषण सहसंबंध और नवजात शिशुओं पर इसका प्रभावःअजमेर शहर की अमीर एवं गरीब शहरी आबादी का तुलनात्मक अध्ययन

A

Synopsis submitted for the Degree of

Doctor of Philosophy (Ph.D.) in Zoology

to

MAHARSHI DAYANAND SARASWATI UNIVERSITY, AJMER

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Appendix – IV-A

Format for Outline (Synopsis) of Proposed Research Work

(to be supplied in Four Copies)

(Reference Ord. 124.11)

1. Name of Scholar (In English) :……..

   (In Hindi) :……

2. Title of the Research work :…….

   (In English) :……..

   …….

   (In Hindi) :……..

   ……

3. Location
   a. Institution/department where the work is to be done
   b. Geographical area of investigation, if any.
4. Introduction importance of Proposed Investigation, Objective.
5. Review (Work already done on the subject of proposed Research Study.)
6. Research Gaps indentified in the proposed field of investigation. (Based on the review)
7. Major Hypothesis, if any
8. Research methodology.
9. List of reference cited.

Signature of the candidate with date

Outline Approved

Name and signature of supervisor with date & seal.

APPENDIX- IV

FORMAT FOR OUTLINE OF PROPOSED RESEARCH WORK

1. **Name of Scholar :**
   - I. (In English) : **Swapana John**
   - II. (**हिंदीमें**) :**स्वपनाजोन**
2. **Title of Research Work:**
   - **I.** (In English) : Psycho-social andnutritional correlates of anemia in pregnant women and its effect on the neonates: A comparative studyof rich and poor urban population in the city of Ajmer.
   - **II.** (**हिंदीमें**) : गर्भवती महिलाओं में रक्ताल्पता का मनोसामाजिक एवं पोषण सहसंबंध और नवजात शिशुओं पर इसका प्रभावःअजमेर शहर की अमीर एवं गरीब शहरी आबादी का तुलनात्मक अध्ययन।
3. **Location:**

a.Institution / Department where the work is to be done-

PG Department of Zoology, Samrat Prithviraj Chouhan Government College, Ajmer.

b.Geographical area of investigation:

The Ajmer city is in the northwest section of India and is surrounded by the Aravalli mountains.It is situated on the lower slopes of Taragarh Hills of that range. It lies at $26^0$33'47 to $26^0$37'36 North latitude and $74^0$49'39 to $74^0$52'43 East longitude in the central Aravalli region and 478m above mean sea level. Itfalls is the eastern semi-arid agro-climatic zone. The massive rocks of Nagpathar range protects Ajmer from the Thar desert to the west (Bhalla,2017).According to the Census of India, 2011 Ajmer (M. Corp.) has a population of around 542,321 in its urban agglomeration out of which 48.64% are female. The schedule caste's population is 24.76% and schedule tribe's populations is 1.91% of the total population. The average literacy rate is 76.80% of which male literacy rate being 81.41% and

female literacy rate is 71.94%.Female contribute 17.87%in total work force ofthis city (DCO, 2011).

4. Introduction, Importance of proposed Investigation, Objectives:

Motherhood is the most beautiful phase of a women, but it also faces a lot of challenges and problem from the moment of her conception, major one among them being anemia.

Anemia can be defined as a medical condition having low hemoglobin level in blood. It is a state in which the hemoglobin content of the blood is lower than normal for a person's gender, age and environment which result in decreasing the oxygen carrying capacity of the blood(Maeyer and Adiels-Tegman,1981).

Globally, two hundred million people suffer from anemia every year, with prevalence rate being highest among women of reproductive age, infants and young children, and those of poor socioeconomic status being the targeted ones (Galloway,2002).Anemia is one of the leading cause of disability during pregnancy and is a major public health problem (Chatterjee and Fernandes,2014).

During pregnancy anemia can be classified either as acquired or hereditary. The iron deficiency anemia, anemia associated with acute blood loss or anemia caused by infection are categorized under Acquired anemia. This eventually turns out to be the major root problem for the pregnant women.

As pregnancy induces various physiological and hormonal changes which often confuse the diagnosis of several disorders and the assessment of the suitable treatments. This holdstrue in case of anemia. Pregnancy is a special state where there is an increase of iron demand which rises from 2.5mg/day in earlier weeks to 6.6mg/day by third trimester. If there is an imbalance between demand and supply, the women are most likely to develop anemia (Maeyer andAdiels-Tegman,1981).

Anemia, during pregnancy is the reduction in hemoglobin concentration of less than 11 g/dl(WHO,1992), during which plasma volume increases disproportionately as compared to the red cell mass which result in a physiological disorder. The women body needs (among other things) iron, vitamin B12 and folic acid to produce red blood cells. If there is a shortage of one or more of these basic necessities, anemia will eventuallyoccur (Hart, 1990).

There are various factors which play an important role in the development of anemia. The factors like low socio-economic status, lack of education, poor hygiene, eating habits and other cultural demographic factors are of high prevalence in developing countries like India (Jahan, 2017).

There is undoubtedly an intimate relationship between the physical and psychological well-being of a mother and her child in the womb (Bakketeig *et al*., 1979).Anemia during pregnancy can lead to an intrauterine growth retardation, increased maternal morbidity and mortality, low birth weight, early delivery (by two or three weeks), affects the birth weight and iron stores of the child and it also adversely impair the mother's immune system (Abdalla, 1996).

It is important to identify the level of risks if any, faced by the pregnant women and her new born coming from low socio-economic background and a victim of biased norms in Ajmer, Rajasthan.

Hence to understand the level of danger faced by a pregnant woman and her child, affected by the socio-economic factors compared to that of pregnant women well taken care off, it is necessary to analyze and compare their socio economic, environment, physiological status and the resultant outcome of their pregnancies.

Therefore, the major objectives of the proposed research are:

[i] Toidentify the psycho-social, economic, physiological and environmental factors leading to anemia during pregnancy in rich and poor urban population.

[ii] To follow up of the nutritional health profile of the pregnant mothers from third trimester.

[iii] To study the mental and physical health profile of the neonate.

[iv] A comparative outlook of the result between the pregnant women from low socio-economic background and that of from a high socio-economic background specially in terms of nutrition.

[iv] To suggest rationale mitigation measures for further action by various stakeholders with special concern for the women coming from low economic status.

It is expected that the proposed study will contribute to a more informed evaluation and response to the under privileged mothers and their children coming from the poor section of the society and is relevant to present day interests so as to focus on the development of every section of the society so that we hope for the betterment of the state and that of the Nation as a whole.

5. Review:

Pregnancy is a physiologically specific period during which the needs for some nutrients increase beyond normal. While the nutrient requirements of the general population can be met by an adequate diet, risk of suboptimal micronutrient intake is common during pregnancy

and supplements might be useful to meet dietary requirements for specific key nutrients.Anemia in pregnancy is not exclusively a medical problem, rather it is a socio-medical-issue (Blumfield, 2013).

Scientific study and approach on anemia has been done down through the years and it has evolved over the years. Anemia can be defined as a state in which the quality or the quantity of the circulating red cells is reduced below standard. According to Chatterjee (1950), anemia in pregnancy – "unless otherwise qualified refers to anemia appearing during pregnancy in otherwise normal woman". In a broader sense it may however, include any anemia either prevalent before pregnancy or else induced and/or has remained unveiled by the pregnancy.

Although it has been proved deficient diet increased the morbidity and mortality among the mothers and children (Hytten and Leitch, 1964). But it could be also possible that besides diet other factors like housing, psychological stress and over work have also their shares in the production of this state of anemia during pregnancy (Bagchi and Bose, 1962; Hytten and Leitch, 1964).

Further studies revealed that there is an interrelation between mother's nutrition and the health of the neonate. Mukherjee and Biswas (1959) in South India, Achar and Yankier (1962) in Madras found the occurrence of difference in the birth weight of babies in the upper and the poorer section of the society.

A World Health Organization review in 1982 proposed the prevalence of nutritional anemia in developing countries (except China) to be 60 percent in pregnant women and 47 percent in nonpregnant women. In a later review, in 1985, it was estimated in developing countries (again except China) that 59 percent of pregnant women were anemic, and 47 percent of all women were anemic. Based on the later review, it was stated that the total global prevalence of anemia is estimated to be about 30 percent: 36 percent of the entire population in the developing regions (1,200 million people) as compared to only 8 percent (100 million people) in the developed areas (Maeyer and Adiels-Tegman, 1981).

There are diverse converging contributing factors leading to anemia which include nutritional, genetic, and infectious disease factors, however deficiency in iron still is the major cause of 75% of anemic cases (Haider, 2006; Baig and Ansari, 2008; Balarajan, 2011).

The United States Centers for Disease Control and Prevention's (CDC) definition of anemia in pregnancy differs from the WHO definition only in the second trimester where the cut off hemoglobin is < 10.5 g/dl and haematocrit is < 32% (CDC, 1998). While according to the World Health Organization (WHO), anemia in pregnancy occurs when, at sea level, the

hemoglobin is < 11 g/dl or the haematocrit is < 33%, regardless of gestation (WHO, 2011). In spite of these definitions, anemia in pregnancy is not quite straight forward, because of the various physiologic changes that occur during pregnancy, which also involve the haematologic system (Ouzounian and Elkayam, 2012).

The iron losses during normal physiologic changes among pregnant women and the significant increased requisite of iron during the second and third trimester of pregnancy makes it unavoidable that, women will become anemic, without iron supplement (INACG, 1989).

Dakshsyani and Rammurthy (1964) discovered that during first and second trimester an average weight gain is of 1.7 kg and rise of BMR is 4.9%.While in the last trimester weight gain is 6 Kg (over prepregnant level) and BMR enhance by 12.2%. Pregnancy is a special state where there is an increase of iron demand which rises from 2.5mg/day in earlier weeks to 6.6mg/day by third trimester. If there is an imbalance between demand and supply, the women are most likely to develop anemia (Maeyer and Adiels-Tegman,1981).

Pregnancy in itself is a cause of anemia: the blood volume increases by about 50% while the total red blood cell mass expands by only about 25%, resulting in so-called dilutional or physiological anemia of pregnancy (American College of Obstetricians and Gynecologists, 2008). This physiological anemia can be aggravated by nutritional problems, including iron, folic acid, and vitamin B12 deficiencies. Iron deficiency is recognized as the prime cause of these acquired anemia in pregnancy (Tripathi and Tyagi, 2012). Many women in India begin pregnancy with iron deficiency, and this deficiency is compounded as iron requirements increase during the course of pregnancy (Goonewardene *et al.,* 2012).

During pregnancy, poor health of women compromises the health of the fetuses. Female children may suffer added health problems due to uneven distribution of household resources.In many societies, women are given less share of the family food, of family resources devoted to medical care, and are also deprived of other goods such as education.

Given the outline of nutritional discrepancy against young girls and women, on the basis of social norms, superstition, religion and economic background, the situation may be even more serious for them. This, in turn, may have life threatening implications on the health of all children. The two strongest elements of birth weight during pregnancy are pre-pregnancy weight and weight gain (Winikoff and Debrovner, 1981) and good fetal growth depends on thenutritional health of the mother at least as much as on any other known factors. Low birth

weight, in turn, presents one of the strongest and most universally apparent risks for consequent mortality in young infants.

Belsey and Royston (1987) mention that there is an eight-fold risk of maternal death coupled with hemoglobins of less than 8 grams per cc. during pregnancy. Low birth weight and perinatal mortality have also been termed as related to low pregnancy hemoglobins, particularly those lower than 9 grams per cc. (Kuizon*et al*., 1985).

High prevalence of anemia and its adverse consequences on health, due to the low dietary intake of iron and folate, India was one of the first, among the developing countries to take up a National Nutritional Anemia Prophylaxis Program (NNAPP) which aimed to prevent anemia among pregnant women. NNAPP was initiated during the fourth 5-year health plan in 1970 with the purpose of reducing the prevalence of anemia to 25%. The Government of India advices a minimum dose of total 100 iron and folic acid tablets to be prescribed during pregnancy (Agarwal *et al.*, 1988).

Studies suggest that a fall in maternal hemoglobin below 11.0 g/d1 is correlated with a significant increase in perinatal mortality rate (Watson, 1997). It has been reported by several authors about the potential relationship between maternal hemoglobin concentration and diverse neonatal outcomes in the whole neonatal population. The weight of the new born babies of anemic mothers are below normal, CHL, HC, in future they also will not be having immunity to prevent diseases. Moreover, such babies are susceptible to be influenced with congenital diseases. Preterm delivery accounts for 75% of perinatal mortality and more than half of long-term morbidity (Stevens and Finucane, 2013). The overall occurrence keeps increasing, especially in very preterm infants (born before 33 weeks of gestation) who present the poorest outcomes and the highest mortality rates (WHO, 1992).

Clinical manifestations of anemia include fetal growth restriction, preterm delivery, low birth weight (Levy *et al*., 2005), impaired lactation, poor maternal/infant behavioral interactions, postpartum depression and increased fetal and neonatal mortality(Lee and Okam, 2011).The burden of adverse pregnancy outcomes (APOs), which includes both preterm births and low birth weights (Beck *et al.,* 2010; Lee and Katz*et al*., 2013) is substantial in both developed and developing countries (Blencowe *et al.,*2012) in anemic cases. More than 60% of preterm births is in south Asia and sub-Saharan Africa (Blencowe,*et al*.,2012). A recent study revealed that 12.8 million babies were born small for gestational age in India alone in the year 2010, a prevalence of 47% of all births (Lee and Katz *et al.*, 2013).

According to World Health Organisation (WHO) 12.8% and 3.7% of the maternal mortality in Asia and Africa directly ascribed to anemia (Khan and Wojdyla*et al.,* 2006). Anemia directly causes 20 percent of maternal deaths in India and indirectly accounts for another 20 per cent of maternal deaths. There may be a reduced supply of oxygen to the uterus (and fetus) in pregnant women with anemia because of the impaired tissue (Webster and Abela, 2007). Reduced delivery of oxygen to tissues emerges to be the central mechanism by which anemia mounts the risk of injury to maternal organ (brain, heart, kidney) and mortality(Hare *et al.,* 2013).

Anemia in pregnancy most commonly results from nutritional deficiency either iron or folic acid (Ishaq*et al.*, 2016). The condition may beaggravated for women who face a biased society norm. Normal physiologic changes in pregnancy affect the hemoglobin (Hb), and there is a relative or absolute reduction in Hemoglobin concentration. The most common true anemia's during pregnancy are iron deficiency anemia (approximately 75%) and folate deficiency megaloblastic anemia, which are more common in women who have inadequate diets and who are not receiving prenatal iron and folate supplements (Kumar andKeerthinmayee, 2017).Anemia inturn become a major threat to the fetus and also become life threatening to the pregnant mother.

6. Research gaps identified in the proposed field of investigation:

Anemia during pregnancy and associated birth outcome is not just a physiological condition but it is associated with various psycho-social and nutritional conditions in rich and poor urban setting. It is therefore necessary to draw a comprehensive picture of this problem to understand various correlates. However, a few studies already reported anemia during pregnancy notably by Gupta *et al.*(1989), Siddiqui *et al.*(2016), Khatana and Yadav (2017) as a medical condition. Therefore socio-economical approach for the study of the cause of anemia in terms of nutrition, psycho-social factors, demographic norms persistingin the particular sect of the society and its adverse effect on their newborn is necessaryto cover the gaps in knowledge that are standing in the way to planadequate measures for prevention of this condition.

7. Major Hypothesis, if any:

It is hypothesized that the psycho-socio, economic and nutritional factors have no correlation with the nutritional level in pregnant women and thus do not contribute to anemia in pregnancy and associated birth outcome.

8. Research methodology:

For the particular setting of Ajmer, a structured questionnaire for the maternal and neonate health will be designed using key elements of relevant data collection tools developed by Abdalla*et al.* (2008), Leader *et al.*(2008), Ghazi *et al*.(2013), Tan *et al*. (2016).This will be the main methodological tool to collect the required data and information. It will consist of psycho-social, economic data, nutritional and physiological data, pregnancy related details, environmental conditions, occupation, care and housing.Selection will be random from the rich and poor population, of the women attending the various Government and charity (maternity) hospitals. The pregnancy outcome will be measured in terms of maturity, spontaneous abortions, birth weight, APGAR score and any other complications. Values of body weight, the crown-heel length and the head circumference of the neonate will be taken with the help of the medical staff. Data of hemoglobin and values of blood pressure will be taken with the help of the medical staff of the hospital for each interviewed woman. The assessment of hemoglobin willbe performed by testing the peripheral blood. Frequency distribution, percentages, mean, standard deviation, and confidence limits for hemoglobin levels will be tabulated. Prevalence of anemia is based on the World Health Organization recommended cut-off thresholds. Data will also be analysed by using chi-square method ($\chi 2$) at a significant level of P=0.05 by using the software Program Statistical package for the Social Sciences (SPSS) to examine the influences of socio-economic factors on the prevalence of anemia (Hinkelmann, 2012).

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Signature of the candidate with date

Outline Approved

Name and signature of supervisor with date and seal.

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S.P.C GOVERNMENT COLLEGE, AJMER

RAJASTHAN

CERTIFICATE

Course work paper -2nd and 3rd (Review of Literature and Research Proposal)

This is to certify that Mr./Ms./Mrs. _____son/daughter/wife of _____, has qualified / not qualified the course work of paper 2nd and 3rd for the registration in Ph.D programme in the P.G Department of Zoology, S.P.C Government College, Ajmer on _____.

Signature with date
Research Supervisor

Signature with date
Head of the Department(Zoology)

Principal Signature

(S.P.C Government College, Ajmer)